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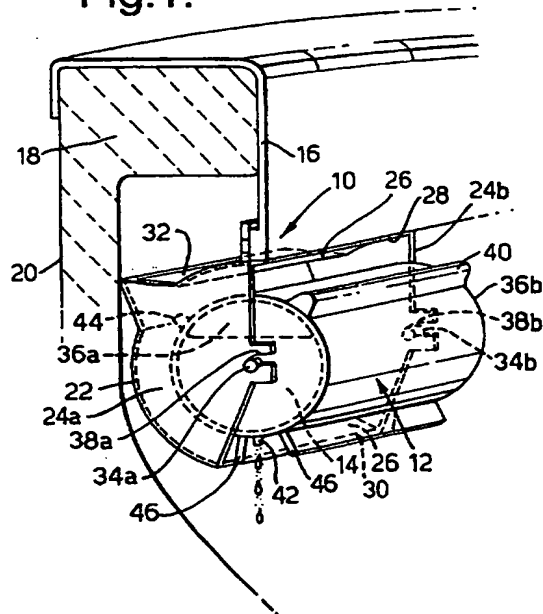
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None

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UK CL (Edition Q ) E1C C36B  
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(54) Abstract Title  
**Apparatus for dosing an active agent into the flush water of a toilet**

(57) Apparatus for dosing an active agent in the flush water of a toilet, the apparatus comprising:  
suspension means 10 for suspending a reservoir 12 containing an active agent 14 from the rim 18 of a toilet bowl 20 in the path of the flush water;  
the reservoir being rotatably mounted in relation to the suspension means and includes an outlet for dispensing the active agent from the reservoir, the reservoir includes a biasing means which in the absence of flush water prevents dosing of the active agent from the reservoir by biasing the reservoir in a rest position, wherein on flushing, the reservoir is rotated from the rest position to a dosing position, and the active agent is thereby dispensed from the outlet into the flush water, and whereupon after flushing is completed, the biasing means returns the reservoir to the rest position.

Fig.1.



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Fig.1.

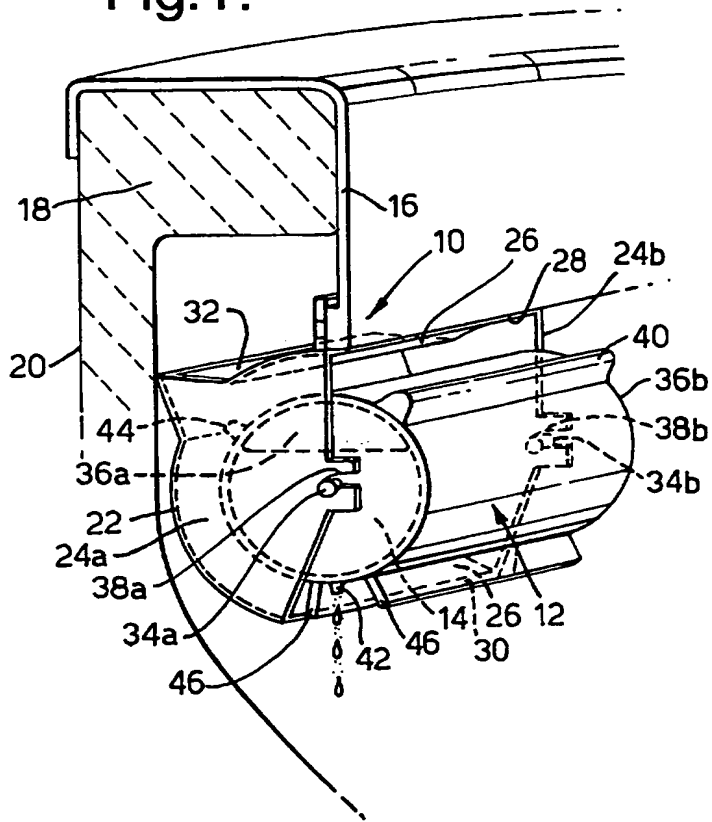


Fig.2.

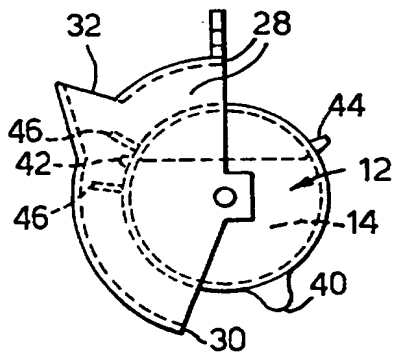
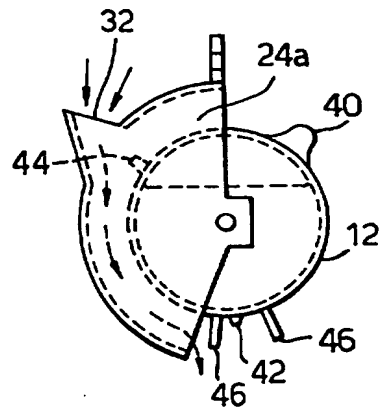


Fig.3.



**APPARATUS FOR DOSING AN ACTIVE AGENT INTO A TOILET**  
**BOWL**

- 5 The present invention relates to materials, apparatuses and methods for dosing an active agent into the flush water of a toilet.

In order to maintain an acceptable level of cleanliness in the toilet, an active agent such as a disinfectant, a limescale removal agent and/or a  
10 deodorising agent are often dispensed into or around the toilet bowl. The active agent may be introduced into the toilet bowl directly from a bottle, by placing the active agent in the flushing system itself, or by suspending the active agent from the rim of the bowl in the path of the flush water. Conveniently, such active agents are dosed into the toilet bowl in small,  
15 relatively reproduceable increments every time the toilet is flushed.

Previously, solid blocks of cleansing and freshening agents have been suspended from the rim of the toilet bowl. However, such blocks have a short life time, they may provide uneven dosing of the active agent as the  
20 block is eroded by the flush water, and they typically include complicated formulations and/or fillers to achieve the desired cleansing and/or freshening action.

In an attempt to overcome the aforementioned disadvantages associated  
25 with solid blocks of active agents, attention has focused on devices including a liquid active agent formulation, which may be in the form of a relatively viscous liquid or gel, for suspension from the rim of a toilet bowl.

European patent application EP-A-0,538,957 relates to a unit having a bottle containing a cleansing and odorising liquid for suspension from the rim of a toilet bowl. The cleansing and odorising liquid seeps from the bottle onto a porous mass when the unit has been suspended in the toilet bowl. The flush water flows over the porous mass and dispenses the active agent around the toilet bowl. A disadvantage of such a unit is that the active agent may be unevenly dosed into the toilet bowl because as the liquid level of active agent in the bottle falls less active agent is dispensed onto the porous mass per unit of time. As a result, the effectiveness of the cleansing and/or freshening action of the unit decreases over a period of time.

European patent application EP-A-0,785,315 relates to a modification of the unit disclosed in European patent application EP-A-0,538,957. The unit includes at least one liquid passage and one air supply opening communicating with the discharge opening of the bottle so that the liquid pressure of the active agent on the porous mass is substantially equal and independent of the liquid level in the bottle. Although the unit may dispense a more even dose of the active agent than the unit of EP-A-0,538,957, the unit has a complicated, cumbersome and relatively expensive construction, and requires a liquid active agent having a particular viscosity and surface tension such that no active agent seeps through the air supply opening.

The present invention seeks to overcome the drawbacks of known apparatus for dosing an active agent into the flush water of a toilet, in particular for dosing active agents in liquid form.

According to a first aspect, the present invention seeks to provide apparatus for dosing an active agent in the flush water of a toilet, the apparatus comprising:

5                    suspension means for suspending a reservoir containing an active agent from the rim of a toilet bowl in the path of the flush water;

10                   the reservoir being rotatably mounted in relation to the suspension means and includes an outlet for dispensing the active agent from the reservoir, the reservoir includes a biasing means which in the absence of flush water prevents dosing of the active agent from the reservoir, by biasing the reservoir in a rest position, wherein on flushing, the  
15                   reservoir is rotated from the rest position to a dosing position, and the active agent is thereby dispensed from the outlet into the flush water, and whereupon after flushing is completed, the biasing means returns the reservoir to the rest position.

20                   By the term "active agent" is meant an agent which provides a cleansing, water purifying, deodorising, disinfecting, germicidal and/or freshening action. In particular, the active agent may include a foaming/cleansing agent such as a mixture of surfactants, a perfume, a disinfectant, bleach,  
25                   an emulsifying agent, and/or a calcium-binding substance for removing limescale deposits. Additionally, the active agent may include a dye, preferably a water-soluble dye.

Preferably, the active agent is in the form a liquid such as an aqueous solution, gel, emulsion or suspension. More preferably, the active agent is in the form of an aqueous solution or gel, for example a water alkaline solution with a variable proportion of the aforementioned active agents,  
5 and is made by methods well known to those skilled in the art.

However, the active agent could also be in the form of finely divided free flowing powder or crystals.

10 According to a further aspect of the invention, there is provided a product for dosing an active agent into the flush water of a toilet, comprising an apparatus as defined above containing an active agent in the apparatus reservoir.

15 The apparatus is of simple construction, and when the toilet is flushed, it provides an even dose of active agent into the flush water irrespective of the quantity of active agent present in the reservoir. Between toilet flushes, the active agent may also conveniently slowly evaporate through the outlet to provide a constant air freshening effect.

20

Preferably, when the reservoir is at the rest position, the outlet is above the level of the active agent and when the reservoir is at the dosing position, the outlet is below the level of the active agent. Optimally, apparatus is such that when the flush water flow is activated, the reservoir  
25 may rotate to a position in the configured apparatus (ie when the apparatus is suspended by the suspension means on a toilet rim in the path of flush water) such that the outlet points substantially directly downwards. In such a position, the outlet may be located substantially on the bottom of the reservoir on each usage. Preferably, the outlet is dimensioned to

dispense a specific amount of the active agent from the reservoir. Most preferably, the outlet includes a valve and/or nozzle for dispensing a predetermined amount of the active agent into or around the toilet bowl.

- 5 Preferably, the reservoir is releasably mounted to the suspension means and includes an inlet for filling the reservoir with the active agent. Such an arrangement enables an empty reservoir to be easily and conveniently recharged with active agent, or to be replaced with a separate prefilled reservoir. Conveniently, the reservoir is transparent, or includes a  
10 transparent window for viewing the level of active agent in the reservoir.

Preferably, the reservoir inlet is above the level of the active agent at the rest position and optionally the dosing position of the reservoir. This prevents egress of the active agent through the inlet at the rest position.

- 15 Alternatively, or additionally, the inlet may include a removable closure seal and/or a valve, for example a non-return valve.

- However, when the apparatus is in the rest position and the inlet and outlets consist substantially of simple orifices, or at least do not comprise  
20 any valve means, the lowest of the inlet and outlet orifices in the device in the rest position when the device is suspended on the toilet rim will represent the maximum fill level of the device.

- The reservoir may further include means for harnessing the flush water,  
25 such as at least one external fin extending from the reservoir into the flush water. The harnessing means enables the reservoir to rotate more easily from the at rest position to the dosing position in the flush water. This allows the reservoir to function effectively even in a toilet bowl where the flow rate of flush water is relatively low.

In a further embodiment, the reservoir may comprise separate reservoir sections, which may form sectors of a general reservoir area of the device, with each section optionally having a separate outlet and/or inlet.

5 With this arrangement, it is possible to dispense separately but simultaneously a mixture of active agents into the flush water, without pre-mixing the active agents as a complicated active agent formulation, merely by charging each reservoir section with a different active agent. Moreover, the separate reservoir sections prevent the different active

10 agents from adversely reacting with each other prior to dosing the flush water.

The biasing means retain the reservoir in the rest position in the absence of flush water, and returns the reservoir from the dosing position to the at

15 rest position after flushing is completed.

Preferably, the biasing means is a weight, or a spring. More preferably, for simplicity of design, the biasing means may be a weight that is integral with the reservoir and may conveniently be located on the exterior of the

20 reservoir wall. Alternatively, or additionally, the reservoir may be naturally biased by virtue of its shape and/or the active agent in the reservoir for example, the reservoir may have an oval or egg shaped cross-section.

25 Preferably, the reservoir is cylindrical, and the reservoir is rotatably mounted to the suspension means along its cylindrical axis. Alternatively, the reservoir is rotatably mounted at one end to a pivoting point on a suspension means, for example by means of a strut or member extending



from one end of the reservoir to the pivoting point on the suspension means.

5 The suspension means may include means for spacing the reservoir from the toilet wall and means for funnelling the flush water over the reservoir and/or the harnessing means, as well as means for suspending the apparatus from a toilet rim. To this end, a preferred means for suspending the apparatus from the toilet rim comprises a three sector hook device, which in an initial configuration may comprise three hook portions  
10 each lying substantially parallel to each other, the three portions connected by two "U" shaped substantially 180° bends, and connected at one end to the apparatus. Such suspending means are typically made of resilient plastics materials, and are well known in the trade. The funnelling means serves to guide the flow of flush water over the reservoir, thereby  
15 ensuring the reservoir rotates to the dosing position more readily. Such a feature is particularly advantageous in a toilet bowl where the flush water flow rate is low. The spacing means conveniently provides for unrestricted rotation of the reservoir.

20 According to a further aspect, the present invention provides a method for dosing an active agent in the flush water of a toilet comprising:

- providing apparatus as hereinbefore described;
- filling the reservoir with an active agent;
- suspending the reservoir from the rim of the toilet bowl; and
- 25 passing flush water over the reservoir.

Preferred embodiments of the invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a partially cross-sectioned perspective view of a preferred apparatus in the dosing position suspended from the rim of a toilet bowl.

5        Figure 2 is a cross-sectional view of a preferred apparatus where the reservoir is in the at rest position.

Figure 3 is a cross-sectional view of the apparatus of Figure 2 where the reservoir is in the dosing position.

10

There is shown in Figure 1 apparatus for dosing an active agent in the flush water of a toilet, comprising a suspension means 10 and a reservoir 12 containing an active agent 14 rotatably mounted to the suspension means 10.

15

Preferably, the entire apparatus is made from plastics materials such as polypropylene, polyethylene terephthalate, polycarbonate, polymethyl methacrylate or PETG, by methods known to those skilled in the art, such as injection moulding.

20

The suspension means comprises a three sector suspension hook 16 for suspending the reservoir 12 from the rim 18 of the toilet bowl 20, and a housing 22 in which the reservoir 12 is rotatably mounted. The housing 22 may be permanently or detachably mounted to one end of the hook 16, and the hook 16 and the housing 22 may be integrated or separate structures (ie be interchangeable). The hook can also be adjustable to fit well a variety of toilet rim dimensions.

25

The housing 22 partially surrounds the reservoir 12 and comprises two side panels 24a,b and a back panel 26 having an upper 28 and lower edge 30. The back panel 26 is generally cylindrical in form and is configured similarly to the outer cylindrical surface of the reservoir 12, and includes  
5 a funnelling means comprising an opening 32 for funnelling the flush water over the reservoir 12. Back panel 26 and reservoir 12 are coaxial.

As shown, the reservoir 12 is cylindrically shaped and is mounted along its cylindrical axis to the housing by two axles 34a,b at either end 36a,b of  
10 the reservoir 12. Each axle 34a,b extends outwardly from the ends 36a,b of the reservoir into recesses 38a,b in each side panel 24a,b of the housing 22. Reservoir 12 is free to rotate between rest and dosing positions about axles 34a, b.

15 In a preferred embodiment, the recesses 38a,b are downwardly grooved channels (when the apparatus is configured on the toilet rim) to allow the reservoir 12 to be easily removed from and re-fitted into the suspension means when refilling the reservoir with active agent, but to retain the reservoir 12 rotatingly in the suspension means 10 in use.

20

In an alternative embodiment, the recesses 38a,b are recesses in the side panels 24a, b, and at least one of the axles 34a,b includes a biasing means for outwardly biasing the axle 34a,b from the cylinder into the recess, thereby releasably engaging the reservoir 12 in the suspension means.  
25 Such an arrangement also allows the reservoir to be easily removed from and fitted to the housing 22, whilst retaining the rotating reservoir 12 in the suspension means in use. A contemplated alternative embodiment is where ends 36a, b of reservoir 12 have recesses located in them, which releasably engage co-operating projections (at least one of which is

releasably outwards biased) in side panels 24a, b. In such an embodiment, the releasable biasing of the projections in side panels 24a, b may derive from the manufacturing of housing 22 from a resilient material, with sufficient resilience in the housing to allow projections on  
5 side panels 24a, b to releasably engage recesses in ends 36a, b of reservoir 12.

The reservoir further comprises a weight 40, an outlet 42 for dosing the active agent 14 from the reservoir into the toilet bowl, an inlet 44 for  
10 filling the reservoir with the active agent 14, and at least one fin 46 for harnessing the flush water. The outlet 42, inlet 44 and weight 40 are circumferentially spaced 120° apart on the surface of the cylinder, and the outlet 42 is adjacent to or in between the fins 46.

15 In a particularly preferred embodiment, the inlet includes a non-return valve to allow refilling of the reservoir with active agent but prevent egress of the active agent from the reservoir, and the outlet includes a nozzle/valve to dispense a predetermined amount of the active agent into or around the toilet bowl.

20

The weight 40 forms an integral part of the reservoir 12 and may conveniently extend axially along the entire outer surface of the reservoir. The weight 40 may also project radially outwardly past the upper 28 and lower 30 edges of the back panel 26 and thus may prevent the reservoir 12  
25 from rotating fully within the housing 22. In this way, weight 40 may act to provide a stop at each extreme of rotation, preventing rotation of the reservoir 12 past either the rest position or the dosing position. Should it be necessary, the positioning of weight 40 and the edges 28, 30 of housing 22 could be adapted to facilitate this. However, in the embodiment shown

in the figures, alternative co-operating stop means (not shown) are provided in the housing 22 and reservoir 12 to prevent rotation of the reservoir other than between the rest and dosing positions.

- 5 In use, the apparatus is suspended inwardly from the rim of the toilet bowl by the suspension hook 16 so that the opening 32 of the housing 22 faces the wall of the bowl and is partly under the rim.

As shown in Figure 2, in the absence of flush water, the weight 40 biases  
10 the reservoir 12 to the at rest position where the inlet 44 and outlet 42 are above the level of the active agent 14. Thus, dosing of the active agent 14 from the reservoir 12 is prevented.

On flushing, the flush water passes through the opening 32 and is  
15 funnelled over the reservoir 12 and fins 46 extending from the surface thereof. The reservoir 12 rotates approximately 120° to a dosing position as shown in Figure 3, where the outlet 42 is below the level of the active agent 14 and directed downwards towards the inner sloping wall of the toilet bowl. The active agent 14 is dosed into the flush water and onto the  
20 inner wall of the toilet bowl. In the process of this rotation of the reservoir, weight 40 is elevated to a higher position than it was in the rest position, and the apparatus is retained in this position by the pressure of the flush water on fin(s) 46. However, at the end of the flush, the pressure of the flush water on fin(s) 46 decreases and eventually ceases, in  
25 which time the force of gravity on weight 40 causes reservoir 12 to rotate about its cylindrical axis, back to the rest position as indicated in Figure 2.

## CLAIMS

1. Apparatus for dosing an active agent in the flush water of a toilet,  
the apparatus comprising:

5

suspension means for suspending a reservoir containing an  
active agent from the rim of a toilet bowl in the path of the  
flush water;

10

the reservoir being rotatably mounted in relation to the  
suspension means and includes an outlet for dispensing the  
active agent from the reservoir, the reservoir includes a  
biasing means which in the absence of flush water prevents  
dosing of the active agent from the reservoir by biasing the  
15 reservoir in a rest position, wherein on flushing, the  
reservoir is rotated from the rest position to a dosing  
position, and the active agent is thereby dispensed from the  
outlet into the flush water, and whereupon after flushing is  
completed, the biasing means returns the reservoir to the rest  
20 position.

20

2. Apparatus as claimed in Claim 1 wherein the apparatus cannot dose  
the active agent through the outlet when the reservoir is in the rest  
position.

25

3. Apparatus as claimed in Claim 1 or 2 wherein the outlet points  
substantially downwards when the reservoir is in the dosing  
position.

4. Apparatus as claimed in any one of the preceding claims wherein the reservoir is releasably mounted to the suspension means.
5. Apparatus as claimed in any one of the preceding claims wherein the reservoir includes an inlet for filling the reservoir with the active agent.
6. Apparatus as claimed in Claim 5 wherein the inlet includes a removable closure seal and/or a valve.
7. Apparatus as claimed in any one of the preceding claims wherein the reservoir further includes means for harnessing the flush water.
8. Apparatus as claimed in Claim 9 wherein the means for harnessing the flush water comprises at least one external fin extending from the reservoir into the path of the flush water.
9. Apparatus as claimed in Claim 7 or 8 wherein the outlet means is adjacent to or in between the harnessing means.
10. Apparatus as claimed in any one of the preceding claims wherein the reservoir comprises separate reservoir sections.
11. Apparatus as claimed in Claim 10 wherein each reservoir section includes an outlet for dosing an active agent and an inlet for filling the reservoir section.
12. Apparatus as claimed in any one of the preceding claims wherein the biasing means is a weight or a spring.

13. Apparatus as claimed in Claim 12 wherein the biasing means is a weight which is integral with the reservoir.
- 5 14. Apparatus as claimed in any one of Claims 1 to 13 wherein the reservoir is cylindrical.
15. Apparatus as claimed in Claim 14 wherein the outlet is positioned on the outer circumference surface of the cylinder.
- 10 16. Apparatus as claimed in Claim 14 or 15 wherein the axis of the cylindrical reservoir is rotatably mounted on the suspension means.
- 15 17. Apparatus as claimed in any one of the preceding claims wherein the inlet, outlet and biasing means are circumferentially spaced at approximately 120° intervals around the reservoir, and the reservoir is rotatable approximately 120° in the suspension means between dosing and rest positions.
- 20 18. Apparatus as claimed in any one of the preceding claims wherein the outlet includes means for dispensing a metered dose of active agent.
- 25 19. Apparatus as claimed in anyone of the preceding claims wherein the outlet includes a nozzle and/or a valve.
20. Apparatus as claimed in any one of the preceding claims wherein the suspension means comprises means for spacing the reservoir from the toilet wall.



21. Apparatus as claimed in any one of the preceding claims wherein the suspension means includes means for funnelling the flush water over the reservoir.
- 5 22. Apparatus as claimed in any one of the preceding claims wherein the suspension means includes a housing that at least partially surrounds the reservoir.
- 10 23. Apparatus as claimed in any one of the preceding claims wherein the suspension means includes a hook for suspending the reservoir from the rim of the toilet bowl.
24. Apparatus according to Claim 23 wherein the hook is adjustable.
- 15 25. Apparatus according to Claim 23 or Claim 24 wherein the hook is interchangeable.
26. Apparatus as claimed in any of the preceding claims wherein the housing has a back panel which is generally cylindrical.
- 20 27. Apparatus as claimed in any of the Claims 14 to 26 wherein the reservoir and the back panel are coaxial.
- 25 28. Apparatus as claimed in any of Claims 1 to 13 wherein the reservoir has an oval cross-section.
29. Apparatus according to any of the preceding claims wherein the reservoir is in the form of a detachable refill.

30. A product for dosing an active agent into the flush water of a toilet comprising an apparatus according to any of Claims 1 to 29 containing an active agent in the apparatus reservoir.
- 5
31. A product according to Claim 30 wherein the active agent is in the form of a liquid.
32. A product according to Claim 30 or 31 wherein the outlet is above  
10 the level of the active agent when the reservoir is in the rest position.
33. A product according to any of Claims 30 to 32 wherein the outlet is below the level of the active agent when the reservoir is in the  
15 dosing position.
34. A product according to any of Claims 30 to 33 wherein the inlet is above the level of the active agent and optionally the dosing position of the reservoir at the rest position.
- 20
35. A product according to any of Claims 30 to 34 wherein the reservoir is in the form of a detachable dispensable refill.
- 25
36. A method for dosing an active agent in the flush water of a toilet comprising providing apparatus as claimed in any one of claims 1 to 29; filling the reservoir with an active agent; suspending the reservoir from the rim of the toilet; and, passing flush water over the reservoir.

37. Apparatus for dosing an active agent in the flush water of a toilet substantially as described and/or depicted herein with reference to the description and accompanying drawings.
- 5 38. A method of dosing an active agent in the flush water of a toilet substantially as described and/or depicted herein with reference to the description and accompanying drawings.



The  
Patent  
Office  
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Application No: GB 9909164.7  
Claims searched: 1-38

Examiner: D. Haworth  
Date of search: 14 July 1999

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.Q): E1C (C36B)

Int CI (Ed.6): E03D 9/02, 9/03

Other:

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
	None	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.